the norman wells pipeline

project orientation

INTERPROVINCIAL PIPE LINE (NW) LTD.

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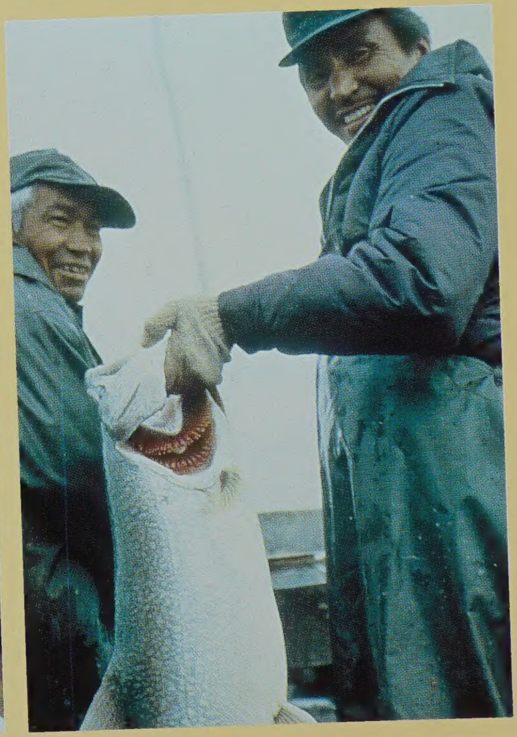
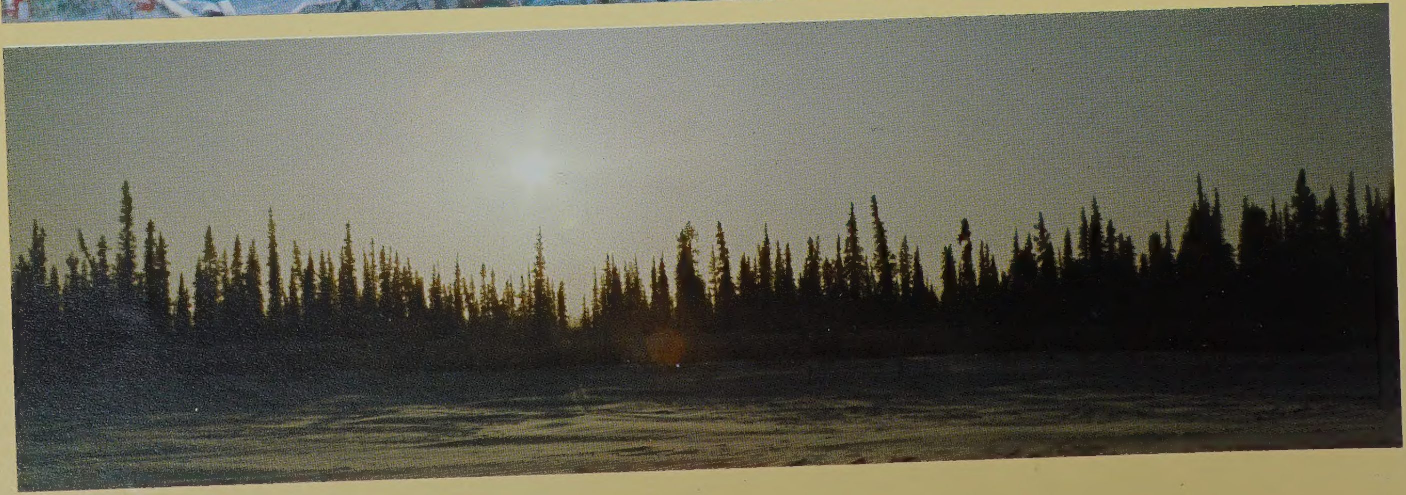
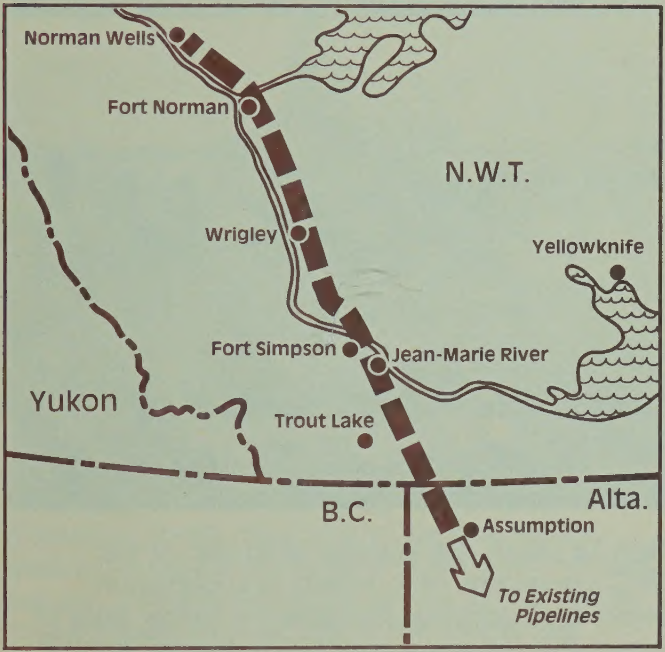




MEETING THE CHALLENGE

The Norman Wells Pipeline will extend from Norman Wells in the Northwest Territories to Zama in northern Alberta. Owned and operated by Interprovincial Pipe Line (NW) Ltd. (IPL), this small diameter (12 inch) buried pipeline will carry crude oil 866 km (538 miles) south where it will connect to the existing Rainbow pipeline system. The pipeline right-of-way extends up the Mackenzie Valley on the east side of the Mackenzie River, crosses the river near Fort Simpson and then continues southeast to Zama, Alberta.

The challenge faced by IPL is to build and operate the Norman Wells Pipeline without serious negative effect on the environment or the people in communities along the pipeline route.
The purpose of this booklet is to increase worker awareness of the socio-economic and environmental concerns associated with building the Norman Wells Pipeline.



A PIPELINE IN THE MACKENZIE VALLEY

During the 1960's and 70's the Mackenzie Valley was studied intensively as a potential corridor for moving northern energy to the southern marketplace. The need for environmental and socio-economic input into development was recognized. The Mackenzie Valley then became the focus of a great deal of research and planning. By the late 1970's a number of studies had assessed the resources of the Mackenzie Valley and examined the issues related to development.

In 1979, based on plans by Esso Resources to increase production of the Norman Wells oilfield, a detailed impact assessment examined a proposed oil pipeline from Norman Wells to Zama. In 1980 an application was submitted to the National Energy Board for authority to construct and operate the "Norman Wells to Zama Pipeline." Public hearings were held by both The Federal Environmental Assessment and Review Panel and the National Energy Board. In late 1981 the NEB granted a Certificate of Public Convenience and Necessity allowing IPL to construct and operate the pipeline.

Since 1980, IPL has undertaken numerous engineering, environmental and socio-economic studies to fulfill the terms and conditions of this certificate and to ensure that the most comprehensive and current information is available to planners.

Project Organization

The owner/operator of the Norman Wells Pipeline is Interprovincial Pipe Line (NW) Ltd. IPL manages all phases of project construction and operation. A Construction Services Manager (CSM) has been appointed by IPL for material procurement, field management and inspection during construction. CSM services are being provided by a joint venture company formed by UMA-Canuck-Hardy. Project design is being managed by IPL using various engineering and planning firms.

Project Schedules

Construction of the Norman Wells Pipeline will take place over the course of three years, the majority taking place during the winter months. The pipeline route has been divided into six construction spreads. Construction commenced in January of 1983 with right-of-way clearing on Spreads 1, 4, 5 and 6. Development of some facility and borrow sites also began at this time and will continue throughout 1983. Actual pipeline construction will kick-off in January 1984 on Spreads 1, 4 and 6. The remaining site development and right-of-way clearing on Spreads 2 and 3 will also be started at this time. Construction of the pipeline will be completed by June, 1985. Once on stream, the pipeline will carry approximately 4,000 cubic meters (25,000 barrels) of oil per day.

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REGIONAL HISTORY

The people who are native to the Mackenzie River region have inhabited the area for at least 5,000 years. They had a hunting and gathering way of life and pursued their livelihood by moving from place to place on a seasonal basis to take advantage of available food sources, including: fish, moose, caribou, small game and berries. The people were loosely organized into bands, generally based on family ties.

The map shows, in general terms, the traditional territories of the first residents of the Mackenzie Region. Although the inhabitants are able to recognize their differences among themselves, to you they will likely refer to themselves as Dene (pronounced De-neh), which means "the people." In addition to the Dene, there are many Metis who live in the region.

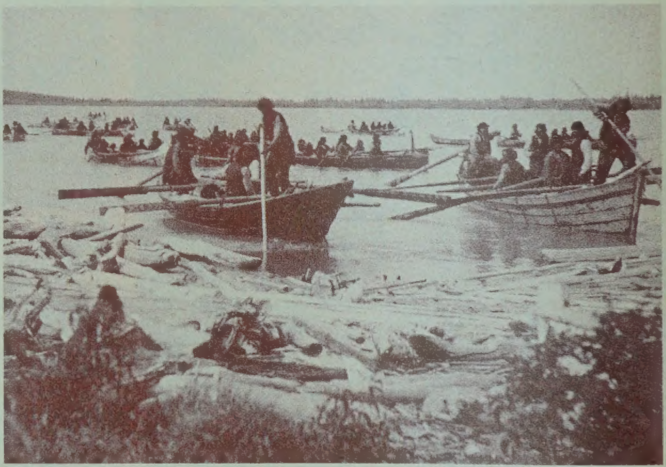
The Fur Trade

Territorial occupancy of the various Mackenzie region groups was drastically affected by the arrival of the white man; who came initially and primarily to acquire furs and left, in exchange, tea, tobacco, blankets, pots, tools, firearms, and unfortunately his diseases.

It was the practise of the native people to gather at the best fishing sites during the summer season. Thus, by 1850 most trading posts were logically established at some of these same locations. Aside from providing a reliable source of food for the traders, these locations allowed ease of access to the Indians who brought the fur. The Mackenzie River along which the majority of the posts were situated thus became the prime transportation corridor of the region.

Missionaries

Additional changes were brought about by missionaries who came north to promote Christianity among the natives. The native people were persuaded to settle near the missions, where schools and hospitals were built to encourage a permanent and growing population within the settlements.



High fur prices, the Klondike gold rush of the 1890's and later, new mineral and petroleum exploration activities stimulated a further influx of non-native entrepreneurs. During the first two decades of the present century the northward migration pattern intensified.

Treaties

The influx of non-natives with all its attendant political, economic and social implications led to the negotiation and signing of Treaty No. 8 in 1899 and 1900. The area under treaty covered most of north-eastern British Columbia, Alberta and Saskatchewan and also included the land between the 60th parallel and south shore of the Great Slave Lake. The present boundaries of the North West Territories were established in 1911.

Resource Discoveries

The discovery of oil at Norman Wells in 1920 (although natural oil seeps were noted by Alexander Mackenzie in 1789 and observed and used by the natives centuries earlier) had a lasting impact on the Mackenzie District.

This new potential for resource wealth, along with the identification of valuable metal deposits in the Canadian Shield, adjacent to the Mackenzie Valley, prompted the Federal government to seek treaties with the remaining natives. In 1921, Treaty 11 was signed by the Dene in the Mackenzie Valley.

Increased interest in the area encouraged the immigration of entrepreneurs who demanded greater services, particularly transportation.

The resulting developments and expansions rapidly turned the Mackenzie River into the region's prime transportation corridor and established its long-term economic importance.

In the early 1920's, after drilling several wells in the Bosworth Creek Area, Imperial Oil installed enough equipment at Norman Wells to refine the crude oil into a type of fuel oil suitable for use by the Mackenzie Valley communities and fishing boats.

The Second World War led to the need to improve transportation and logistics systems in America's North West. A series of airfields, the Alaska Highway and the Canol Pipeline were the result. During the 1940's, construction of the Canol Project brought thousands of workers into the Mackenzie region.

The Canol pipeline from Norman Wells to Whitehorse was completed and tested but developments in the war had made it unnecessary. This small inch pipeline and the refinery at Whitehorse were dismantled and sold as army surplus.

Government Programs

By the 40's and 50's, the interest and activity in mineral development subjected the Northwest Territories to major social and economic changes, including increased Federal government involvement.

Government programs were introduced to try to improve social and health conditions and educational opportunities. Unfortunately, the success of these programs was very limited because they were initiated without taking into account the needs, traditions, attitudes, and lifestyles of the people they were trying to help.

In 1953, the Department of Northern Affairs and Natural Resources was established. The Department became responsible for the administration of Crown lands, and forests, management of fur and mineral resources, promotion of education, social welfare, industrial development and provision of engineering services. In the performance of its appointed functions it became the largest employer in the north and set patterns which are still applicable today.

Also, during the 50's, large scale construction activity (such as DEW line bases and the town of Inuvik), together with industry's renewed interest in base metals and petroleum exploration introduced the Dene to various employment possibilities as an alternative to living off the land.

Important base metal discoveries and increased oil and gas exploration in the north during the 60's and 70's led to more government involvement and an increased impact on the lives of the native northerners.

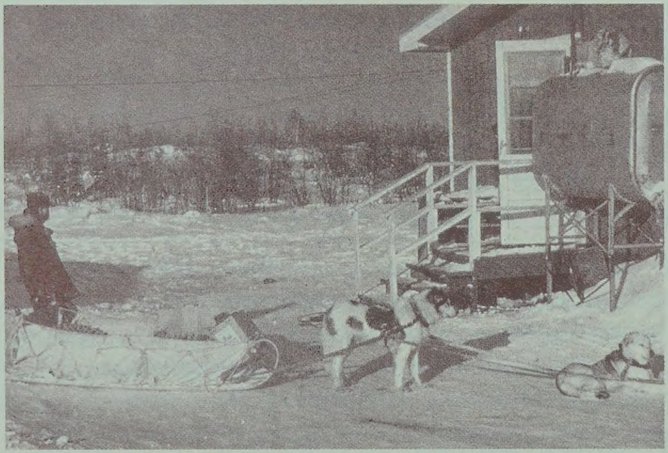
Northern Political Awareness

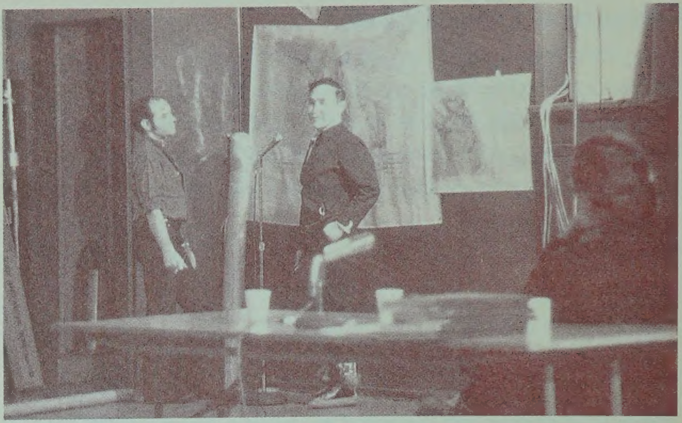
In the 1970's, the native population became politically active in an effort to reverse what they perceived to be an erosion of their land base and culture.

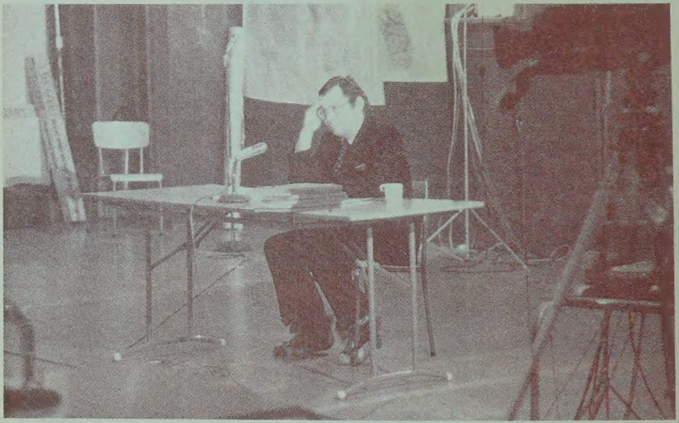
Since then, the Dene and the Metis have taken legal steps to protect their land claims and ensure that they are adequately compensated for any disruptions or changes to their land and traditional lifestyles.

When Canadian Arctic Gas Pipelines and Foothills Pipelines submitted plans to use the Mackenzie Valley transportation corridor for the construction of a natural gas pipeline in the early 1970's, the natives strongly opposed the approval of either project in an effort to gain greater control over their own political and economic development.

The 1977 Berger Report to the Government of Canada concluded that the construction of a large diameter pipeline in the Mackenzie Valley might have some serious social impacts on the residents.







A ten year moratorium on development was recommended by Mr. Justice Berger to allow for settlement of native land claims, assessment of frontier reserves and the establishment of programs and institutions which would permit land use planning and orderly resource development.

Although the Berger Report was received, it was not endorsed by the Federal government and after five years of planning and negotiations, Interprovincial Pipe Line's application for its Norman Wells Project was approved.

However, the project is under intense public and government scrutiny.

PROJECT AREA COMMUNITIES

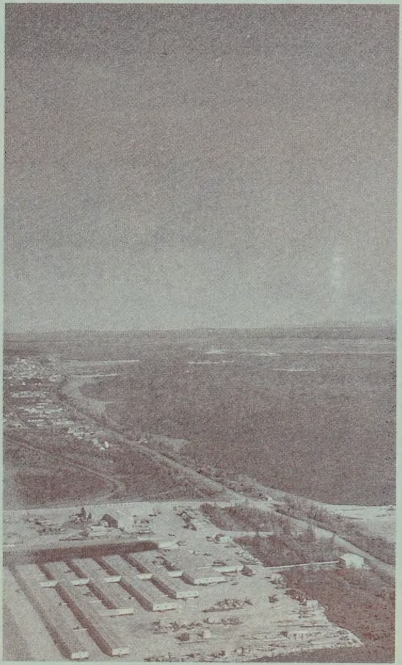
The total population of the Northwest Territories and Alberta communities nearest the pipeline route is only about 6000. These communities, highlighted below, are the ones which stand a greater chance for some form of project-related impacts – negative or positive.

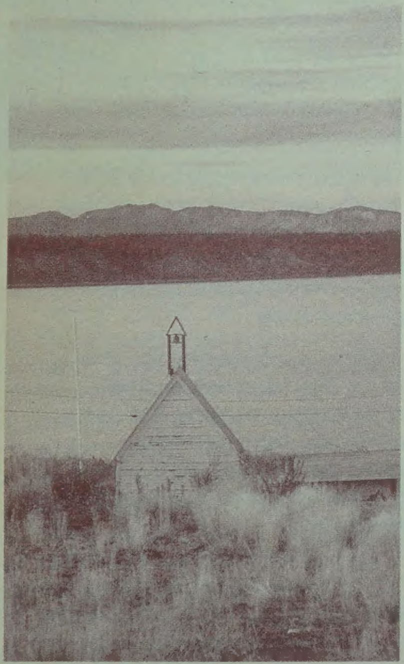
Norman Wells

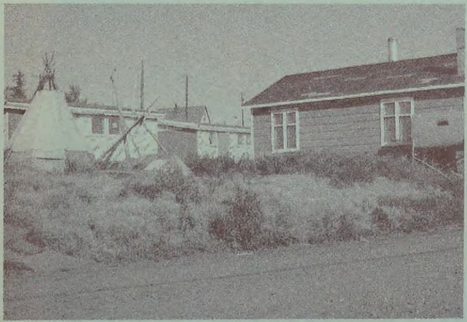
The hamlet of Norman Wells, the northern terminus of the pipeline, has a population of around 500, mostly non-natives.

Unlike other settlements on the Mackenzie River, which started as trading posts, Norman Wells was the first community in the Northwest Territories to be established entirely on the basis of non-renewable resource development.

Today, in addition to Esso's oilfield and refinery operations, Norman Wells is a major transportation centre for air and river traffic in the central Mackenzie.







Fort Norman

Fort Norman is a picturesque community of about 330 people, mostly of Dene origin.

The Northwest Company was very active in this area during the late 1700's and in 1810, a post was founded at Fort Norman to serve as a link between Fort Good Hope and Fort Simpson.

The community's strategic location (at the junction of the Great Bear and Mackenzie Rivers) has made it a transportation centre since the days of early exploration in the region.

The Fort Norman site has long been of seasonal importance to the Dene of the region. Today, hunting, fishing and trapping still form the economic base of the settlement, recently supplemented by wage employment in mineral exploration.

Wrigley

Wrigley is a community of about 170 people, situated in an area which has been inhabited by the Dene since pre-historic times.

The residents value their semi-traditional lifestyle and most continue to hunt, trap and fish on a seasonal basis, often spending a good part of the year on the land.

Fort Simpson

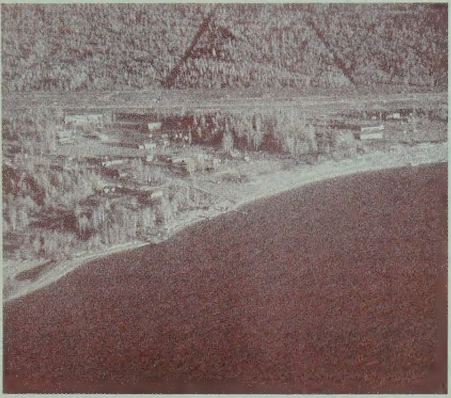
The largest Northwest Territories community in the project area is Fort Simpson. Its current population is about 1000, two-thirds of which are of native origin.

Fort Simpson was built in 1804 by the Northwest Company and has the distinction of being the largest and oldest continuously occupied trading post on the Mackenzie River.

The village is connected to the south by the Mackenzie and Liard Highways, making it a key modern-day transportation centre. Fort Simpson also serves as a base for mineral exploration development.

Jean-Marie River

Jean-Marie River, located close to Fort Simpson, is a Dene community of about 50 people. The people of Jean-Marie generally continue to maintain a seasonally oriented hunting and trapping lifestyle.



Trout Lake

The community of Trout Lake, located on the south shore of Trout Lake, is a small Dene settlement of about 60 whose inhabitants follow primarily a hunting, trapping and fishing lifestyle.

Northwestern Alberta

The Alberta section of the Project Area has a total population of about 4000, with about 2400 in the industrial service centres of High Level, Rainbow Lake and Zama City. The other 1600 people live in the native communities of Assumption, Bushe River and Meander River. Of these three Dene communities, Assumption is the largest, with most residents pursuing some sort of land-based traditional activity, supplemented by some participation in the wage economy.

PROJECT REGULATION AND INSPECTION

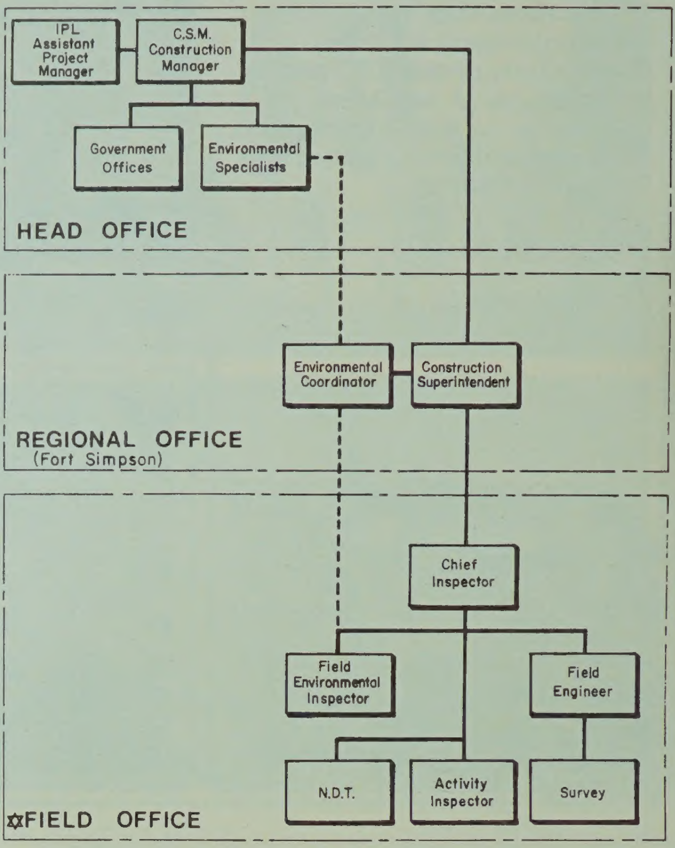
Although the Norman Wells Project covers a considerable distance, it is not considered a particularly big or complex job. However, the history of previous pipeline proposals has left government and the public extremely sensitive to the potential impacts of pipeline projects in the north. Therefore, the regulatory process is very tough. Many people are considering the Norman Wells project a "pilot" to test theories about impact, the effectiveness of government regulations and controls, and the industry's performance. The result is that all phases of this project are being watched very closely and must reflect the pipeline industry's readiness to take part in responsible northern development.

Interprovincial Pipe Line (NW) Ltd. is regulated by the National Energy Board. NEB inspectors will be on site to ensure that the pipeline is constructed according to the terms and conditions of the certificate.

Inspectors representing the Department of Indian Affairs and Northern Development, the Government of the Northwest Territories and the Province of Alberta will be on site periodically to monitor compliance with the various permits and licenses obtained by IPL.
Quality control will be maintained on behalf of IPL throughout pipeline construction by pipeline specialists and inspectors. These people will monitor pipeline construction providing expert advice and direction in solving problems as they may arise.

Trained and experienced Activity Inspectors will monitor day to day construction operations and will report to a Chief Inspector. Environmental Inspectors will be on site to provide advice and direction to Activity Inspectors on environmental matters.

INSPECTION TEAM ORGANIZATION


IPL Assistant Project Manager
C.S.M. Construction Manager
Government Offices
Environmental Specialists
HEAD OFFICE
Environmental Coordinator
Construction Superintendent
REGIONAL OFFICE
(Fort Simpson)
Chief Inspector
Field Environmental Inspector
Field Engineer
N.D.T.
Activity Inspector
Survey
✡FIELD OFFICE

✡ This is a typical field activity organization

Socio Economic Action Plans

It is generally agreed that with the introduction of any major project, there will be some impacts on the society, economy and environment where the project is introduced. The impacts may be negative (such as the risk of "boom and bust" economy, increased inflation and the disruption of traditional lifestyles) ... or they may be positive (in the form of increased training, employment and business opportunities for northerners).

The identification of potential positive and negative impacts was the basis of a series of Action Plans developed by IPL to be implemented on the Norman Wells Pipeline Project. Quite simply, the aim of these plans is to minimize any negative social, economic or environmental impacts and to maximize the positive effects of the project on the people of the surrounding communities.

These plans are binding legal agreements which must be adhered to in order to ensure not only the successful completion of this project but also the industry's credibility in proposing future ones.

IPL is committed to a number of Action Plans dealing with social and economic concerns. Of these, the main ones include: "Information and Consultation," "Northern Business Opportunities," "Orientation" and "Construction Manpower Delivery."

The "Information and Consultation" plan is designed to increase the understanding and awareness of both IPL and the public regarding their respective concerns about the project.

In fact, many northerners have already had direct input into the planning and design of those aspects of the project which may affect them or their communities.

Project information is also being made available to any interested groups, including communities, governments and northern residents in general.

The purpose of the "Northern Business Opportunities" plan is to provide local northern businesses with maximum opportunity for participation in the project.

IPL is continuing to identify potential business opportunities for northerners and match northern suppliers with project requirements. For example, the clearing and site preparation contracts, as well as supply contracts for sandbags, concrete weights and rough lumber on the project have been awarded to northern companies.

The brochure that you are reading is part of the "Orientation" plan which will enable all of the employees of IPL and its contractors to understand and respect the socio-economic and environmental issues related to the project.

Employment of northern residents by various contractors and sub-contractors is a part of IPL's "Manpower" plan. Northern residents thus will constitute a measurable portion of the work force.

In addition to these Action Plans, IPL has also developed specific courses of action in other areas of concern, including: O&M training and employment, community infrastructure, transportation, security and socio-economic monitoring.

THE ENVIRONMENT – ISSUES AND PROTECTION PROCEDURES

The Climate

Although the climate varies considerably in the project area, it is characterized by long, cold winters and short, warm summers.

January is the coldest winter month during which temperatures average between -25 and -30°C, although temperatures as low as -40°C are common. Cold spells are usually accompanied by bright, cloudless skies.

The approach of southern weather systems usually brings somewhat warmer temperatures (-20 to -30°C) and moist air in the form of snow. Snow accumulation varies considerably from year to year but averages between 1 and 1.5 meters. Strong winds are often associated with changing weather patterns in the Mackenzie Valley causing blowing and drifting snow sometimes resulting in a "white-out."

During winter the Mackenzie Valley experiences the short day length characteristic of northern regions. Daylight is at a minimum during the month of December when Norman Wells receives about 3 hours of daylight and Zama 6 hours.

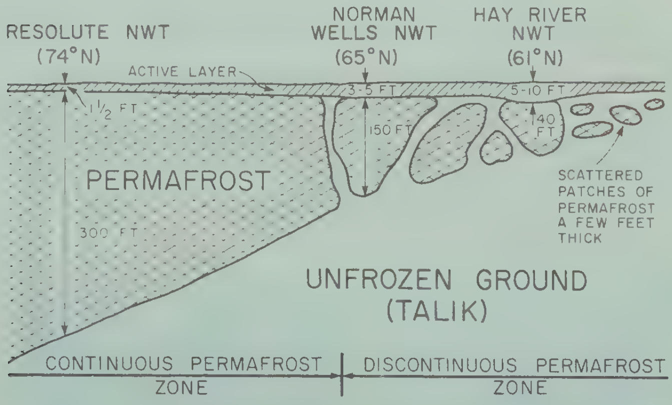
With the approach of summer, air temperatures warm and the days begin to grow longer until June when the sun sets for 2-3 hours each day. Summers are quite hot and dry along the pipeline route often reaching 25 to 30°C in June and July. Weather conditions can change very rapidly and drastically in the Mackenzie Valley. Snow or frost cannot be ruled out in any month.

Personnel working during spring, summer and fall must contend with mosquitoes and blackflies. The obvious defense against these insects is mosquito repellent and to expose as little bare skin as possible.

The Land

From Norman Wells to Fort Simpson the terrain is rolling with numerous valleys and high flat terraces. Well drained areas are covered in tall forests of pine, white spruce, poplar and aspen. Poorly drained areas are covered in black spruce and tamarack. The terrain along the pipeline route is generally flat south of Fort Simpson. Much of this area is poorly drained and dominated by open coniferous forests of dwarfed black spruce and tamarack. Stream banks are typically gradual shallow slopes covered in thick willow and alder. In northern Alberta, muskeg is extensive in poorly drained and low lying areas.

Permafrost, permanently frozen ground, occurs in over 80 percent of the soils of the route in the Norman Wells area and gradually diminishes to about 30 percent of route in the Alberta segment. Permafrost forms as a result of persistent cold temperatures which do not allow the soil to thaw during the short northern summers.



Vegetation and soil cover insulate and protect the pipeline by keeping the permafrost frozen. Thawing of permafrost is an important environmental and geotechnical concern. Unnecessary clearing or grading will cause permafrost to thaw resulting in soil settlement and erosion problems once the pipe is in place. It is therefore essential to minimize disturbance to the terrain and vegetation during the course of construction.

Many slopes over the length of the pipeline have been identified as sensitive on the basis of their permafrost content and degree of slope. These areas are identified in the construction specifications and drawings and workers should be aware of their responsibilities when operating in or around sensitive slopes. Briefly these areas include:

- minimize clearing of vegetation
- minimize grading, removal or damage to the surface organic mat
- hand clear trees on sensitive slopes
- pile slash and debris in the center of the right-of-way away from watercourses and sensitive slopes
- remain within right-of-way boundaries and travel on designated roads and shoo-flies only

Other procedures designed to protect the land nclude the setting aside of special areas designated for the safe storage of fuels, hazardous materials, pipe, equipment, and liquid or solid waste. Workers are responsible for ensuring that all materials they use are properly stored and that the right-of-way, camps, and storage areas are kept clean and free of litter. Vehicle and equipment maintenance will take place only in areas designated for that purpose. Workers will not make fires for any purpose during periods of forest fire hazard.

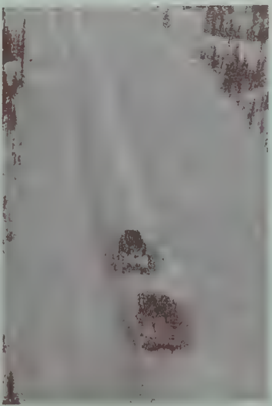
Contingency plans have been developed for use in the event of a fuel spill or forest fire and employees may be called upon to assist in their implementation. A quick and organized response is critical to their success and construction supervisors should ensure workers are completely aware of their responsibilties.

NORTHERN TRAVEL

Much of the Mackenzie Valley is isolated with very few roads connecting communities. The Mackenzie Highway however connects Hay River to Fort Simpson and provides good access to the pipeline corridor. In winter an extension of this highway, the Winter Road, connects Norman Wells, Fort Simpson and the communities in between. The pipeline right-of-way and facility sites north of Fort Simpson are easily accessible by this winter road. Travel along the Mackenzie Highway and winter road is usually good but the traveller should be prepared for sudden changes in weather and remain alert for wildlife on the roads especially around sunset and sunrise. The surfaces of these roads can be very hard on vehicle tires, extra spares are a must for travelling any distance. The general rule for normal travel is to expect the best but prepare for the worst. The following are a few suggestions to keep in mind when travelling.

1. When travelling a long way from camp or the group, let somebody know where you are going, when you are leaving and when you expect to arrive/return.
2. If travelling in a vehicle, try to travel in a convoy and be sure that your vehicle is equipped with emergency equipment such as an axe, a shovel, tow ropes and chains, survival kit and tools for making repairs. Always check the gas and oil levels and the general condition of your vehicle before starting on any journey.
3. Expect that everything will go according to plan but be prepared for emergencies. Carry a survival kit that contains food and equipment for heat, shelter, signalling and first aid.
4. In the event that you become stranded or lost, STAY PUT and remain calm. A search team can more easily locate a stationary target than a moving one.

The winter road will not be used once spring arrives and the ice bridges are no longer safe.



Summer access to the pipeline is usually by means of helicopters. Workers using planes and helicopters to fly along the pipeline should be aware of environmental requirements for restricted zones.

Travel restrictions will be imposed on project staff restricting access to certain communities along the pipeline route. Workers should ensure their travel plans DO NOT include visits to restricted communities.

COLD WEATHER SURVIVAL

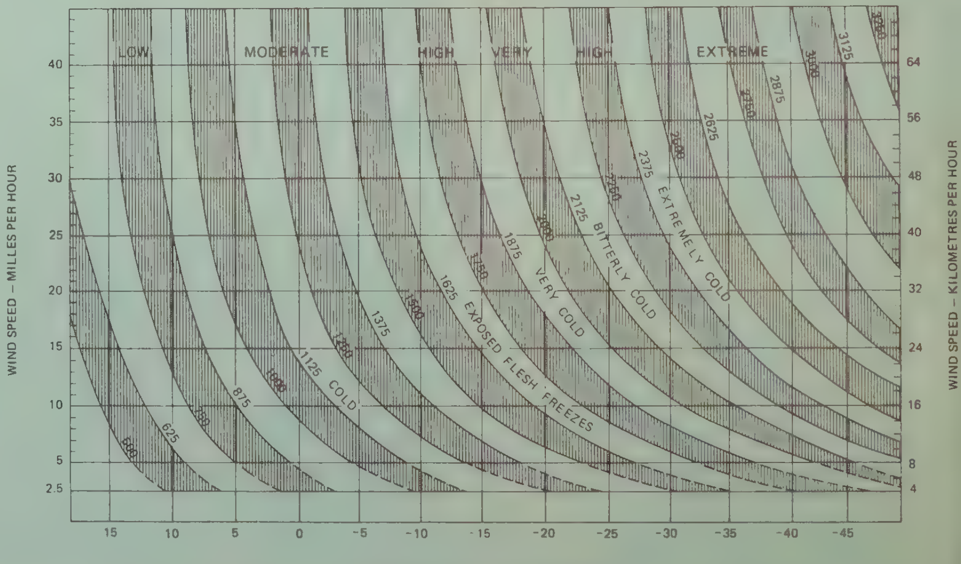
Frost-bite, hypothermia, dehydration and snow blindness are four potential hazards when working under winter conditions in the north. Workers should know what these are and how to prevent and treat them. Victims of any of these conditions should obtain qualified medical advice as soon as possible.

- Frost-bite is the freezing of tissue due to overexposure to cold. It is a gradual process which can occur without the victim's knowledge. Workers can prevent frost-bite by wearing proper warm clothing and periodically warming exposed or cold parts of the body. Treatment of frost-bite is to gradually warm the affected area. Severe cases should be treated under medical supervision.
- Prollonged overexposure to freezing temperatures can result in Hypothermia. This occurs when the internal body temperature drops causing physical and mental collapse. Hypothermia is easily prevented by ensuring you are warm and dry at all times. Victims of hypothermia should be warmed immediately by any means available.
- Overexertion while working at low temperatures can cause dehydration, an excessive loss of water from the body. Dehydration is simply prevented by ensuring adequate intake of liquids during physical activity.
- Sunlight is very bright when reflected off the snow covered landscape. Extended exposure of unprotected eyes to reflected and direct sunlight can cause headaches, eye irritation and in severe cases snow-blindness. This problem is prevented by wearing sunglasses while working outside. Treatment of mild forms of snow-blindness is to move into a darker environment and let the eyes adjust to less harsh light conditions. Severe cases require medical attention immediately.

The discussion on Northern Travel describes safety precautions for traveling through isolated areas. Should workers find themselves in a survival situation Remain Calm, Stay Where You Are and perform the following steps immediately:

1. Treat injuries as best you can.
2. Get comfortable, obtain heat, shelter and food immediately.
3. Prepare signals or signs to aid searchers in locating you.
4. WAIT FOR HELP – IT'S COMING!!!

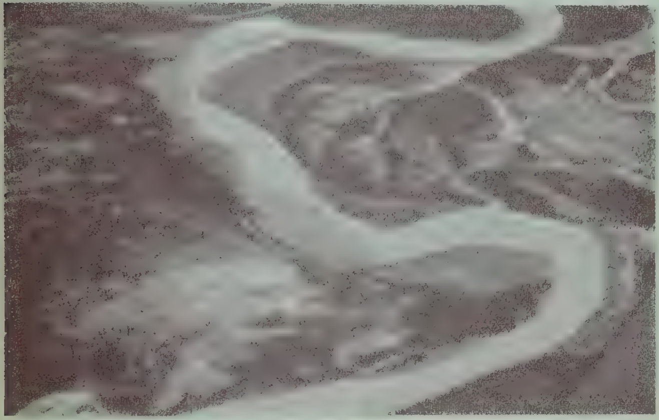
WIND CHILL COOLING RATES
(Watts Per Square Meter)



Water Resources and Fisheries

The Mackenzie River flows north from Great Slave Lake down the Mackenzie Valley to the Arctic Ocean. Along the way numerous lakes, rivers and streams, empty into the Mackenzie. The waters of most small streams and rivers feeding the Mackenzie are clear and cold. Some rivers, notably the Liard, carry vast loads of suspended sediment giving the Mackenzie its brown murky appearance. The pipeline route traverses a considerable portion of the Mackenzie drainage system crossing two major rivers (the Mackenzie and Great Bear) fifteen lesser tributaries and numerous small streams.

Many of the rivers and streams draining into the Mackenzie freeze to the bottom over winter but this is not always the case. An early snowfall or a warmer than expected winter can result in thin ice cover.



Of the fifty different species of fish recorded for the Mackenzie River drainage systems most can be found in the rivers and streams crossed by the pipeline. Arctic grayling, dolly varden, cisco, walleye, pike, trout and whitefish are among the most commonly sought after species. Small streams are important fish bearing waters, especially during winter when many of these lesser tributaries remain unfrozen and are used as overwintering areas for large populations of fish.

On visiting the north one gets the impression that its resources are endless but this is not the case. Fish grow slowly in the cold northern waters. A ten year old lake trout in the NWT is one-sixth the size of its equal in southern regions. Aquatic resources are a very important and valued resource to northern people. Traditionally the Mackenzie drainage system provided northerners with food and transportation. Today it is still used extensively for both purposes and it is essential that every effort is made to protect the water resources along the pipeline route.

Workers should be aware of the following guidelines and ensure that every effort is made to protect water resources.

1. Sediment loading into streams will be reduced by:
   - piling soil material in a safe spot out of the water
   - reducing the necessity for in-stream operations such as ditching.
2. Stream banks and streams will be protected by ensuring that vehicle traffic use shoo-flies for stream crossings and that bridges are available where required.
3. Fish populations will be protected by:
   - employing intake screens and diffuser nozzles for water withdrawal and discharge
   - ensuring that during water withdrawal, stream flow is not significantly reduced
   - ensuring that hazardous chemicals or materials such as gasoline, vehicle oils or garbage do not enter waterbodies and that discharged effluent is properly aerated before entering streams
   - ensuring that no stream blockages occur

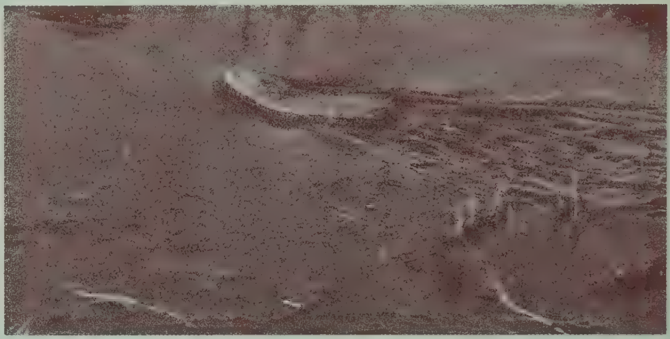
Wildlife

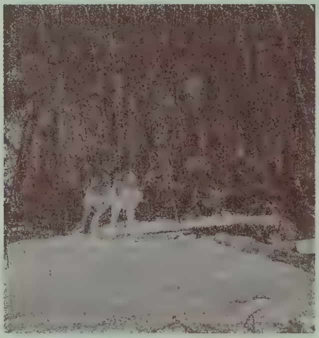
The Mackenzie Valley offers a wide range of wildlife habitat. Approximately 39 species of mammals and 175 species of birds may be found along the pipeline route.

Moose are widely distributed in the vicinity of the pipeline in both winter and summer. In winter their range is more restricted as they remain close to their winter food sources along the Mackenzie River. Although not common, woodland caribou are also found. These animals range widely in their search for food and are more common in the central sections of the route near the Alberta border.

While bears will not likely be seen during winter construction, encounters during spring and summer activities are possible. Grizzly bears prefer rugged habitat and are very rarely found on the eastern side of the Mackenzie River. Black bears on the other hand are very common to the pipeline corridor and may be seen in the summer wandering up and down the many cutlines and stream valleys traversing the region.

Two very commonly encountered aquatic furbearers are beaver and muskrat. These mammals prefer to inhabit meandering streams and rivers. The Mackenzie Valley is also home to a host of terrestrial furbearers such as mink, marten, lynx, wolf, snowshoe hare, and ermine. Local communities rely on furbearing animals for food and income and it is the worker's responsibility to ensure that his actions do not interfere with hunting and trapping activities in the vicinity of the pipeline.

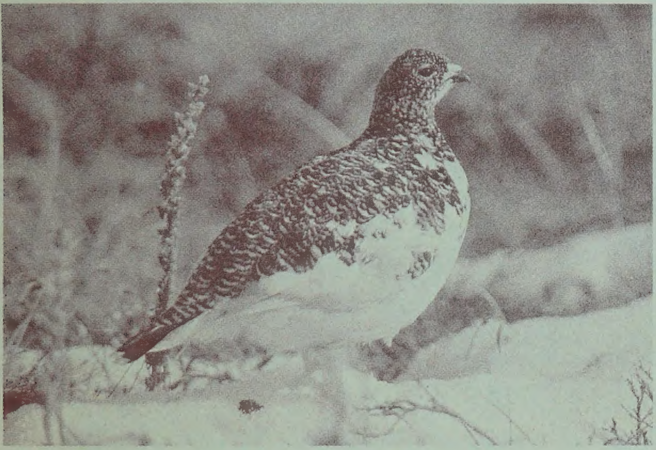


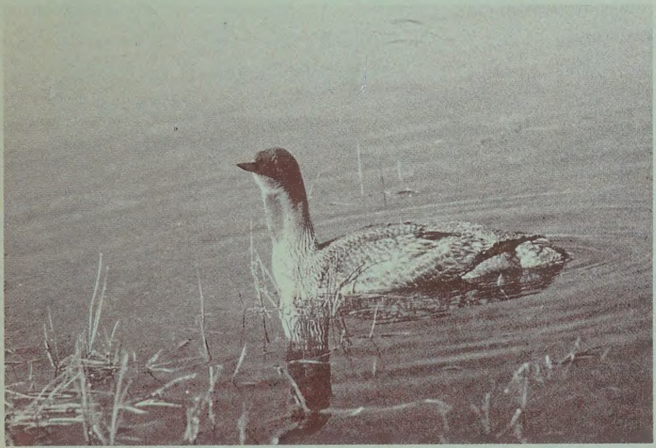


Bears

Bears are unpredictable and dangerous and although they may be great photography subjects workers should make every effort to avoid them at all times. Bears usually shy away from human contact but many animals along the pipeline corridor, especially near the communities, are familiar with people and show no fear of contact. They are continually in search of food and with their keen sense of smell will locate it at great distances. The best way to avoid attracting bears is to dispose of food scraps and garbage by burial or burning. When walking in the bush noise will alert bears to the presence of humans and avoid unwanted surprise encounters. There are no foolproof rules to follow if you meet a bear. Most bears will leave an area once they know you are there, if they do not, DO NOT PANIC. Stay calm and assess the situation for avenues of escape, do not turn and run. If you must retreat to safety, walk slowly backwards facing the bear. In forested areas the safest escape is usually to climb a tree. Loud noises may also scare the bear away. All encounters with bears should be reported to the Environmental Inspector as soon as possible.

Of the 175 species of birds found in the Mackenzie Valley almost all are migratory. The most common waterfowl observed during migration are snow, white-fronted and Canada geese, whistling swans and many species of ducks. Other birds such as loons, grebes, gulls, terns and sandhill cranes are less numerous but still quite frequently encountered. Not all birds continue northward in the spring and flocks of many of these species can be seen wherever there is open water during the summer. Some of the birds that over-winter in the area of the pipeline include, ptarmigan, ravens, snowy and great horned owls, spruce grouse and whisky jaçks.





Of the 17 species of raptors (birds of prey) common to the Mackenzie Valley many can be observed along the pipeline corridor. These include bald and golden eagles, ospreys, peregrine and gyrfalcons, American kestrels and many hawks and owls. Raptors are specialized hunters requiring very large and isolated territories to survive. These birds are not readily adaptable to sudden changes in their habitat and are extremely sensitive to disturbance by man and his machines. Some of these species, such as the Peregrine Falcon are rare.

Special areas have been set aside for the protection of sensitive wildlife and their habitat. The locations of these Restricted Areas are well documented in the construction plans and specifications. Workers are expected to be aware of the location of restricted areas and adhere to the rules and regulations protecting wildlife along the pipeline. These are:

- workers will not feed, injure or harass wildlife
- workers will not keep pets on site nor will they attempt to domesticate wildlife
- when operating vehicles workers will give wildlife the right-of-way
- workers will not destroy wildlife habitat
- workers will not enter a restricted raptor area between the months of April and September unless authorized by the Environmental Inspector
- project aircraft will maintain an altitude of 760 meters (2500 feet) above ground level when flying over restricted raptor areas between April 15 and September 15

Workers are governed by the hunting and fishing regulations of the Northwest Territorial Government. It is company policy that workers do not possess firearms or engage in hunting or fishing activities while working on the project site or on company time.

Vehicle collisions with wildlife or encounters with troublesome animals must be reported immediately to the Environmental Inspector.

Heritage Resources

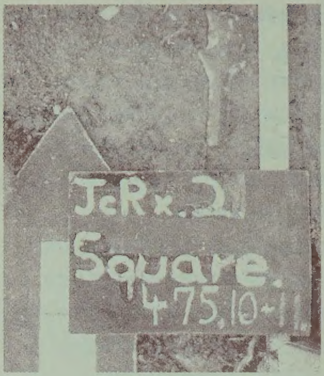
Although the heritage resources of the north are important to all Canadians they hold an even deeper importance for native peoples for in their discovery lies the origin and development of their society and culture.

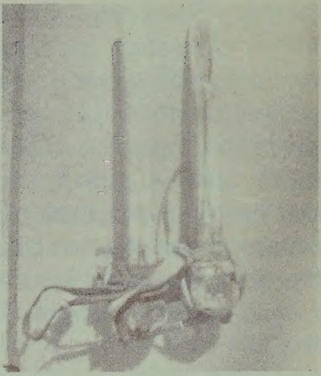
An archaeological site is any place of historical importance. Information about history is obtained at these sites by seaching and digging for evidence of habitation including artifacts such as tools, beads, bone, etc. and interpreting their use and significance to the site's former inhabitants. The importance of an archaeological site varies depending on the information the archaeologist can obtain from it.

The entire pipeline route has been surveyed by professional archaeologists prior to pipeline construction. Most sites occur along rivers and streams as water provided both a transportation route and a source of food to early inhabitants. Three archaeological sites occur close to the pipeline right-of-way and are restricted from investigation. These are found near the Great Bear, Saline and Blackwater Rivers.

Workers will not enter within 40 meters of known archaeological sites. As well, the possibility exists that during construction of the pipeline new archaeological information could be unearthed. It is the worker's responsibility to report immediately to the Environmental Inspector any suspected archaeological information discovered. Collection or removal of archaeological artifacts without permission is against the law.

In addition to this booklet workers will be educated as to their responsibilities by environmental and socio-economic briefings. IPL has made commitments in the areas of environmental protection and socio-economic benefits. It is the responsibility of each and every project participant to ensure that those commitments are fulfilled.





WORKER AS GUEST

As you have seen, this land has been occupied and used extensively for a long time. You may see it as a harsh land ... and it is. It is also very sensitive. The people living here have been successful in adapting to it and exploiting it for food and shelter. They have different ways of doing things ... different values. These values are not the same as yours, but they work successfully for them.

You will likely only be here a very, very short time ... a matter of weeks. You are a visitor ... a guest. Treat the land, its people and their belongings with respect; as you would want visitors to your home to treat you.

The people of the communities that the pipeline will pass close to have said that they would prefer that you not visit. In fact, you WILL NOT be allowed to visit.

This project, because it is the first of what may be other similar projects, is considered a pilot or test by many, especially the people who live here and by governments. You will be watched by many inspectors and you can expect that any infraction of the rules will be noted.

You are here for one thing ... to build a pipeline. If you carry out this task with efficiency there will be no problems.

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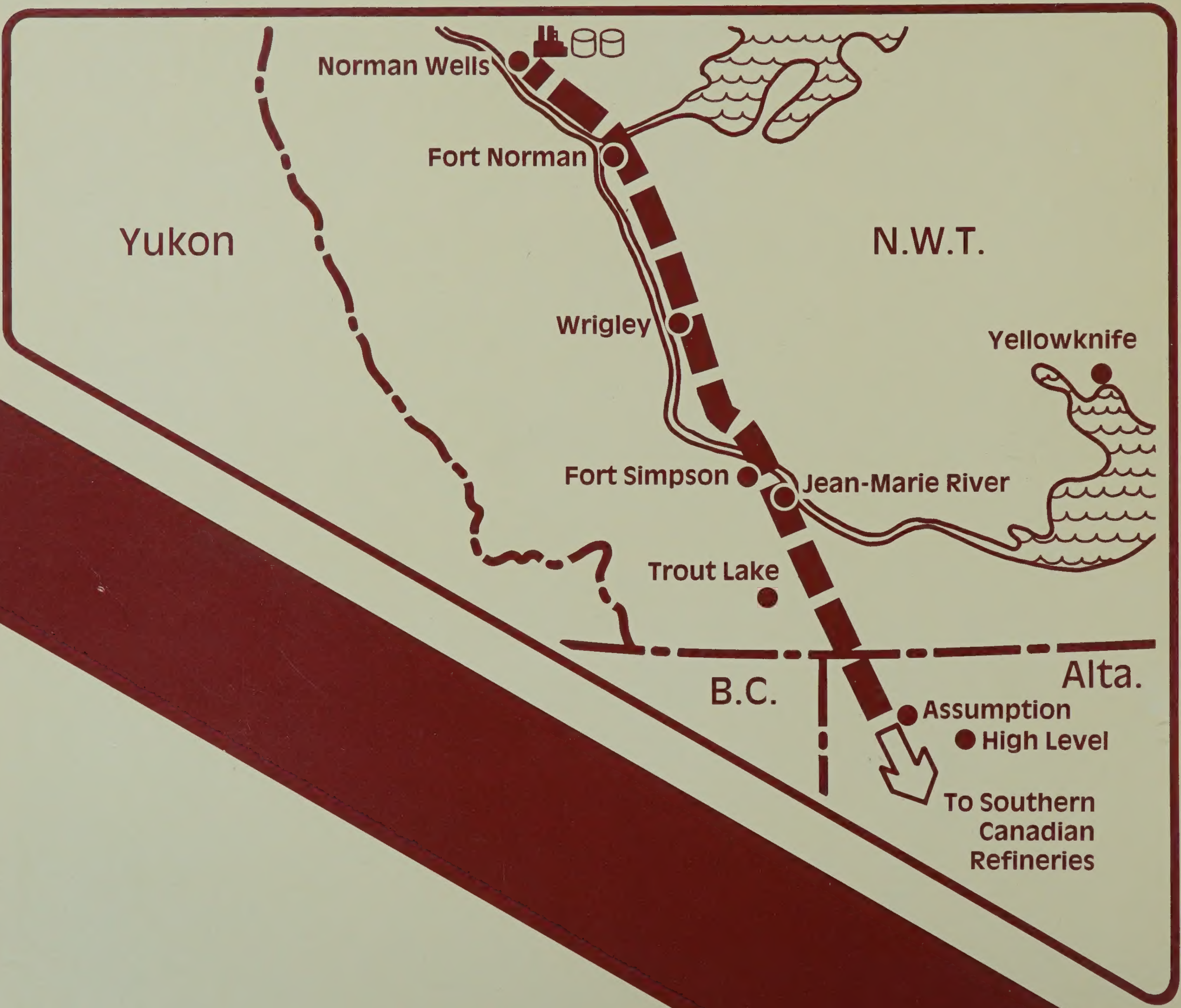

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